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RUBBER GLOVES AS A FACTOR IN MODERN SURGERY

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The employment of rubber gloves as a necessary factor in operative surgical technique is of a very recent date,—so modern an improvement, in fact, that there are a number of surgeons who still operate with bare hands.

Dr. William Stewart Halstead, Professor of Surgery in the Johns Hopkins University, was one of the foremost of American surgeons to do experimental work. It was there, in aid of a strictly aseptic surgical technique that, in the year 1890, he introduced and used rubber gloves with satisfactory results. In 1898, Dr. Charles McBurney, surgeon to Roosevelt Hospital, New York, also reported less infection of wounds where rubber gloves had been employed during an operation, being confident that the agents of wound infection were to be sought among the palpable objects coming in contact with the wound, especially the hands. Dr. Hunter Robb, Professor of Gynecology of the Western Reserve University, Cleveland, and Gynecologist-in-Chief to Lakeside Hospital, believed that the source of wound infection was due largely to the hands of the operator and his assistants, because he found that where gloves were used, there was little or no infection of wounds. Prior to 1890, it appears that silk and cotton gloves were extensively used by German surgeons.

In general, rubber gloves are made in two ways. There is the so-called built up glove, made by hand, vulcanized and steam cured. This type, being cloth-lined, is clumsy and lacks flexibility. The other type is made by the dipping process, the form used being dipped automatically into a rubber compound. These gloves are unlined, less clumsy, and more flexible. The ordinary surgical rubber gloves are usually made from cut sheet rubber, the joints being secured by a narrow strip of rubber solutioned on, vulcanization being effected in the sulphur bath. In still another process, the glove is made in the seamless state from rubber solution, being built up of two or three layers, some of pure and some of compound rubber. There are many different styles of rubber gloves on the market to-day: the very thin, having the advantage of not interfering with the sense of touch; the pebble gloves with the rough surface, for which is claimed non-slipperiness; and the knuckle glove which allows the free bending of the finger joints,—while a combination of all three make the most desirable and durable.

The length of life of the rubber glove depends upon:

First—The process used in manufacturing, the quality of the materials used as well as the perfection of the finished product;

Second—The frequency with which they are sterilized and the methods used. The dry method, with steam under pressure, tends to destroy them and render the rubber soft, while boiling them in water does little injury;

Third—The use to which the gloves are put or, in other words, the type of work to be done by the user. For example, grease and oils cause the rubber to soften;

Fourth—The care with which they are cleaned and prepared for use;

Fifth—The general wear and tear of hard use by the surgeon;

Sixth—The season of year when they are purchased and the method of storing during the summer months.

There are two general methods in use for sterilizing gloves, namely, the wet which consists in boiling the gloves in water or in saline solution; and the dry, accomplished by means of live steam under pressure. If gloves are to be worn wet, immediately before they are needed they are sterilized by boiling for fifteen minutes in water or in saline solution and are then put into some such solution as lysol or bichloride of mercury. Before being placed in the sterilizer, they are wrapped in gauze, the edges of which are secured by weights to the bottom of the sterilizer to prevent gloves from ballooning and floating on the top of the solution. To put on these wet gloves, they are first distended with the solution and the hand is then slipped into the glove, the fluid being forced out at the same time.

In the dry method, the gloves are dried and powdered with talcum, wrapped in a towel or put in a folder, and placed in a pressure sterilizer where they are allowed to remain from ten to fifteen minutes, depending upon the kind of instrument. Before putting on the dry gloves, the hands are first thoroughly dried and powdered. The advantage of the dry method is that the hand is not so likely to perspire and fewer bacteria are extruded in the event of the glove being punctured.

A third method of sterilizing gloves is by a combination of the wet and the dry methods, the gloves being dried by hand.

The method above mentioned is the one extensively used in the Butterworth Hospital with satisfactory results. These gloves are prepared for the surgeon as follows: The blood is washed from both sides of the glove in cold water, then in warm soap and water, rinsed in clear hot water and dried. They are paired off, mended, the patches being put on the wrong side and worn so, then they are tied together,

placed in a wire basket, put in boiling water and allowed to remain twenty minutes.

While the gloves are being sterilized, the nurse dons her cap and scrubs her hands, using running water. She begins with her finger tips and nails, which are next cleaned with an orange-wood stick, then takes the palms of the hands, then half of a finger at a time, anterior and posterior, now again the finger tips and the backs of the hands are scrubbed, then the wrists, the forearms, and lastly the entire hand. This procedure is continued for ten minutes when the finger nails are treated with peroxide and again the scrubbing is resumed for ten minutes, at the completion of which the hands and arms are thoroughly rinsed in clean water and are immersed in a 50 per cent iodine solution, followed by alcohol, 70 per cent. The nurse is now ready for her gown which she removes from its case and puts on, tying her own sleeves. The sleeve is fitted to the wrist by making an inverted plait and folding it in under the wrist. The tapes which are at the end of the plait are brought around the wrist in a circle and tucked in under the same. The tapes at the back of the gown are fastened by a second nurse.

The nurse now arranges the sterile table which should hold twelve sterile towels, glove folder and covers, two sterile basins, and several cans of sterile powder. When this is finished, she puts on her own dry sterile gloves which have been previously prepared. The second nurse now lifts the cage of gloves from the sterilizer and carries it to the scrub nurse who removes the gloves from the basket, placing them in one of the large sterile basins.

The sterile table is covered with a clinic sheet which is folded half way in order to leave space for the drying. A sterile towel is now placed over one end of the table; the gloves are lifted out, a pair at a time, upon a second towel, and are patted dry, then put into the second sterile basin where they are powdered on both sides, wrong side first. Next, the cuff of each glove is turned back three inches and the gloves are placed in the case, one in each pocket. The folders containing the gloves are wrapped in a cover marked with the doctor's name and are placed in a rubber, dust proof and water proof bag, where they are kept until needed.

Cotton gloves are frequently worn over rubber ones in order to protect them from injury as in case of open bone operations. They are also used by some surgeons to make the first incision and are then removed, thus preventing skin contamination of the deeper tissues. They are sterilized for use by the dry method.

The following experiments will, I feel sure, be of interest to surgeons, as well as to surgical nurses, because the reasons put for-

ward for the use of the dry sterile rubber gloves has been that dry gloves are less hard on the hands and do not interfere with the sense of touch, while the wearing of wet gloves does both. The author of the article quoted shows us by actual experiment that this is not true.¹

The author's experiments were conducted from the standpoint of the interference of the rubber gloves with the tactile function. His conclusions were based on observations of some 144 blind patients, who read entirely by finger touch and were dependent on this method for the purpose. Each observation consisted in reading with the fingers thirteen lines of Braille text printed on both paper and brass plates, with the following results:

1. Reading with bare fingers, average time 48 seconds.
2. Reading with average weight, well fitting, dry gloves, 70 seconds.
3. Reading with oil inside gloves, 68 seconds.
4. Reading with gloves placed on wet hands, 65 seconds.
5. Average time for reading with gloves under average conditions, 70 seconds.

Gloves placed on the hands wet impaired the sense of touch less than gloves put on dry.²

In closing I would say that the surgical records show that with the introduction and use of rubber gloves there has been a marked decrease in mortality as well as in infection, following surgical operations. The use of sterile rubber gloves not only safeguards the life of the patient, but serves as a protection to the surgeon against contamination from diseased tissues.

¹Experiments with Rubber Gloves, Carl E. Black, M.D., *Journal Kansas Medical Society*, 1916. ²*The Modern Hospital*, 1916.

HOLD YOUR LIBERTY BONDS

One who subscribes for a Liberty Bond and gets credit as a patriot for doing so is not acting patriotically if he immediately sells that bond, that is, unless he imperatively needs the money, says Secretary McAdoo. It is not the mere subscription that helps the Government, it is the actual loan; shifting the bond to some one else does not help.

The same objection lies to exchanging Liberty Loan Bonds in trade. Merchants offering to take Liberty Loan Bonds in exchange for merchandise are doubtlessly actuated by patriotic motives, but such transactions tend to defeat a primary object of the bond sale, the encouraging of thrift and the discouraging of expenditures. Bonds so exchanged are in most cases immediately sold on the open market which tend to depress the market price and affects adversely the sales of future issues.

Secretary McAdoo expressly states that there is no desire on the part of the Government to prevent or interfere with legitimate trading, in good faith, in Liberty Bonds.

It is one of the great objects of the Treasury Department to have these bonds held as permanent investments by the people and paid for out of savings, thus at once providing funds for the Government and conserving labor and material.